

# Harnessing Mobile Technology for Student Assessment



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## INTRODUCTION

The primary goal of education is to enhance the knowledge and skills of students in domains that broaden their thinking and prepare them to be lifelong learners in their chosen field of study. Assessment of student learning is an important part of the educational process that provides feedback to the student and instructor to promote learning. Concurrent with the advancements in technology, instructors have harnessed emerging mobile technologies to design more efficient and automated forms of student assessment.

We define mobile devices as handheld portable computers that can be operated through touch screen gestures or small keyboards. Tablets fall under the category of mobile devices, but provide several advantages over smartphones, primarily that of having a larger screen without having to carry around a larger (and heavier) laptop computer. Mobile devices are becoming ubiquitous among students and teachers, but are underutilized as tools in education and assessment. However, early adopters of mobile technology are finding novel ways to engage students and are creating new avenues for teachers to assess student learning.

Student assessment is defined as the means of collecting data from students regarding their knowledge, skills, and abilities. Summative assessments focus on attaching a score to students' performance to assign a grade or make individual

comparisons. In contrast, formative assessment "...represents information communicated to the learner that is intended to modify the learner's thinking or behavior for the purpose of improving learning" (Shute, 2007, p. 1). Although mobile devices can dually serve these forms of assessment, we focus primarily on the role of mobile devices in formative assessment.

Because of the recency of mobile technology in education, pioneers and leading scholars in the field are often contemporaries. Andy Burkhardt of Champlain College (Burkhardt & Cohen, 2012), Els Koppen at KU Leuven (Koppen, Langie, & Bergervoet, 2013), and Jeffrey Stowell at Eastern Illinois University are some of the pioneers in the field of classroom polling (Stowell & Nelson, 2007). Peter Dunn at the University of the Sunshine Coast, (Dunn, Richardson, McDonald, & Oprescu, 2012), Arnold Froese at Sterling College (Froese et al., 2012), and Jeffrey Kuznekoff at Ohio University (Kuznekoff & Titsworth, 2013) are current leading scholars in the use of mobile devices in the classroom.

## OVERVIEW

Technology has influenced the mechanism of assessment of student learning throughout the history of education. One common element of using technology in education is the ability to

transmit information simultaneously to many people. Whether it was the chalkboard, an overhead projector, or PowerPoint presentation, in every case the technology provided an efficient way to communicate information in a one-way route from teacher to student. In turn, assessment of student learning traditionally occurred through either oral questioning or taking written examinations. Some instructors seized the opportunity to formalize assessment in standardized tests, which were created initially to measure content knowledge and, later, general reasoning and critical thinking skills (Shavelson, Schneider, & Shulman, 2007).

Educators also took advantage of the processing power of computers to administer exams in a standard computerized environment. For the instructor, this resulted in the added efficiency of automated grading, with the potential to provide computer-based feedback that is objective, accurate and consistent (Mason & Bruning, 2001). Furthermore, individualized feedback provided an avenue for programmed instruction and assessment, which led to various forms of computerized adaptive testing in which the difficulty of the test items depends on performance on the previous items (Hamilton, Klein, & Lorie, 2000; McFadden, Marsh II, & Price, 2002). Computerized testing has replaced many forms of traditional paper and pencil forms of assessment, and now mobile devices are entering the arena of student assessment.

In some classrooms, electronic classroom response systems (CRS) are using devices known as “clickers” that have supplemented or replaced the standard hand-raising method of responding to multiple choice questions posed by the instructor. A receiver connected to a computer captures the students’ responses sent from handheld keypads (“clickers”) and displays a histogram chart with the distribution of answers. The use of this polling system gives students visual feedback about how their answer compares to the rest of the class. Polling systems are popular because they provide

prompt feedback for students and teachers to see the progression of learning. As a result, participation in the classroom increases, students’ responses are less influenced by conformity, and shy students feel especially empowered by the anonymity afforded by the clickers (Stowell & Bennett, 2010; Stowell & Nelson, 2007).

In a similar study conducted by Martyn (2007), the use of clickers had been compared to the typical hand-raising method. Overall, students reported having perceptions of improved grades, understanding of content, and participation in class. Although grades were not statistically different from one another, this study demonstrated that the use of clickers greatly enhanced student participation in learning. With the added value of these clickers, students felt more engaged to participate in the classroom experience (Martyn, 2007). In summary, the use of clickers has increased the amount in which students engage in classroom learning. Continued use of these clickers can provide many benefits for teachers desiring to obtain summative and formative feedback.

## **CURRENT SCIENTIFIC KNOWLEDGE IN MOBILE DEVICE POLLING**

The increased availability of portable technologies has driven the Bring Your Own Device (BYOD) movement in education (Johnson et al., 2013). Instead of institutions being compelled to provide the technology to students, the students bring their own technology to the classroom and have access to electronic textbooks and educational apps that are personalized to their experience (Johnson et al., 2013).

Traditional college age adults (18-29 years) generally are at the forefront of technology adoption compared to other age groups. In a series of recent Pew Research Center surveys of American adults 18-29 years old, 97% of young adults possess a cell phone and 48% own a tablet (Brenner,

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